600V/150A

2-PACK IGBT MODULE (Half - Bridge)

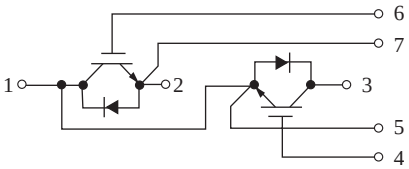
FEATURES

- Trench NPT Technology
- Low $V_{CE(sat)}$
- Low Turn-off loss
- Short tail current
- Positive temperature coefficient
- 10us Short Circuit Capability
- UL Recognized. File No. E305401

APPLICATION

- Motor Controls
- General purpose inverters
- Servo Controls

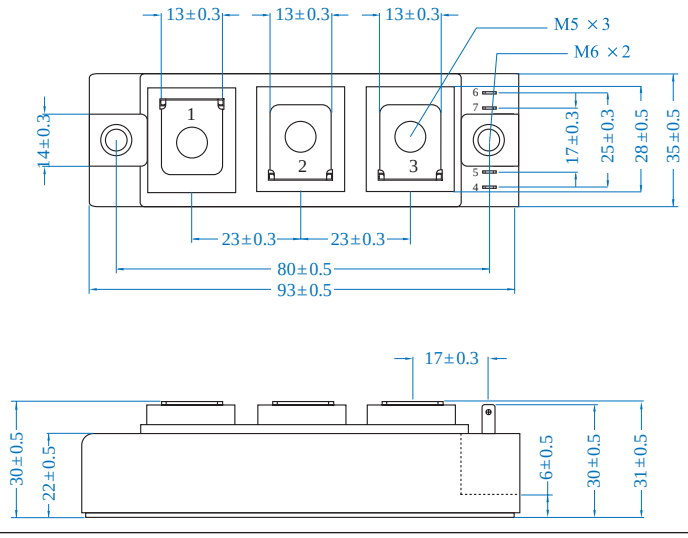
INTERNAL CIRCUIT



1. C2 /E1
2. E2
3. C1
4. G1
5. E1
6. G2
7. E2

OUTLINE DRAWING

Unit : mm



MAXIMUM RATING (Ta=25℃)

CHARACTERISTIC		SYMBOL	RATING	UNIT
Collector-to-Emitter Voltage		V_{CES}	600	V
Gate-Emitter Voltage		V_{GES}	±20	V
Continuous Collector Current	DC	I_C	150	A
Pulsed Collector Current	1ms	I_{CP}	300	A
Power Dissipation		P_D	400	W
Isolation Voltage test	AC @ 1 minute	V_{iso}	2500	V
Junction Temperature		T_j	-40 ~ +150	℃
Storage Temperature		T_{stg}	-40 ~ +125	℃
Weight		Weight	190±5	g
Mounting Torque (M6)		M	5	N.m
Terminal Connection torque (M5)		M	4	N.m

ELECTRICAL CHARACTERISTICS (Ta=25℃)

CHARACTERISTIC	SYMBOL	TEST CONDITION	MIN.	TYP.	MAX.	UNIT
Static						
Collector-Emitter Breakdown Voltage	BV_{CES}	V_{GE}=0V , I_C=1mA	600	-	-	V
Collector Cut-off Current	I_{CES}	V_{GE}=0V, V_{CE}=600V	-	-	1.0	mA
Gate Leakage Current	I_{GES}	V_{CE}=0V, V_{GE}=±20V	-	-	±100	nA
Gate Threshold Voltage	$V_{GE(th)}$	V_{GE}=V_{CE}, I_C=1mA	-	5.2	-	V
Collector-Emitter Saturation Voltage	$V_{CE(sat)}$	V_{GE}=15V, I_C=150A	-	2.0	2.4	V
		V_{GE}=15V, I_C=150A, T_C = 125℃	-	2.4	-	V
		V_{GE}=15V, I_C=300A	-	3.0	-	V
Dynamic						
Total Gate Charge	Q_g	V_{CE}=300V, V_{GE}=±15V, I_C= 150A	-	333	-	nC
Gate-Emitter Charge	Q_{ge}		-	99	-	nC
Gate-Collector Charge	Q_{gc}		-	125	-	nC
Turn-On Delay Time	$t_{d(on)}$	V_{CE}=300V, I_C=150A, V_{GE}=±15V,R_G=10Ω Inductive Load, T_C = 25℃	-	304	-	ns
Rise Time	t_r		-	196	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	346	-	ns
Fall Time	t_f		-	116	-	ns
Turn-On Switching Loss	E_{on}		-	2.8	-	mJ
Turn-Off Switching Loss	E_{off}		-	8.0	-	mJ
Total Switching Loss	E_{ts}		-	10.8	-	mJ
Turn-On Delay Time	$t_{d(on)}$	V_{CE}=300V, I_C=150A,V_{GE}=±15V, R_G=10Ω Inductive Load, T_C = 125℃	-	309	-	ns
Rise Time	t_r		-	201	-	ns
Turn-Off Delay Time	$t_{d(off)}$		-	381	-	ns
Fall Time	t_f		-	120	-	ns
Turn-On Switching Loss	E_{on}		-	3.2	-	mJ
Turn-Off Switching Loss	E_{off}		-	8.6	-	mJ
Total Switching Loss	E_{ts}		-	11.8	-	mJ
Input Capacitance	C_{ies}	V_{CE}=30V, V_{GE}=0V, f=1MHz	-	7735	-	pF
Ouput Capacitance	C_{oes}		-	932	-	pF
Reverse Transfer Capacitance	C_{res}		-	137	-	pF
Short Circuit Current	I_{SC}	V_{CC}=300V, V_{GE}=±15V, t_{psc}≤10us	-	632	-	A

THERMAL CHARACTERISTIC

CHARACTERISTIC	SYMBOL	Max	UNIT
Junction to Case (IGBT Part, Per 1/2 Module)	$R_{th(j-c)}$	0.31	℃/W
Junction to Case (Diode Part, Per 1/2 Module)	$R_{th(j-c)}$	0.4	

ELECTRICAL CHARACTERISTIC OF DIODE

CHARACTERISTIC	SYMBOL	TEST CONDITION		MIN.	TYP.	MAX.	UNIT
Diode Forward Voltage	V_F	I_F = 150A	T_C=25℃	-	1.4	1.6	V
			T_C=125℃	-	1.4	-	
Diode Reverse Recovery Time	t_{rr}	I_F=150A, R_G=10Ω	T_C=25℃	-	109	131	ns
			T_C=125℃	-	149	-	
Diode Peak Reverse Recovery Current	I_{rr}		T_C=25℃	-	55	68	A
			T_C=125℃	-	73	-	
Diode Reverse Recovery Charge	Q_{rr}		T_C=25℃	-	3.71	4.45	uC
			T_C=125℃	-	7.16	-	

Fig 1. Saturation Voltage Characteristics

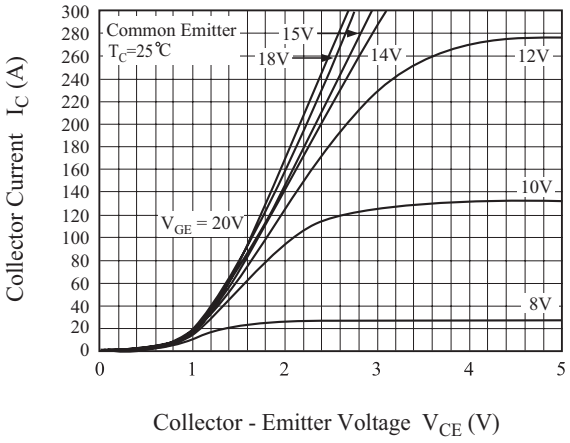


Fig 2. Saturation Voltage Characteristics

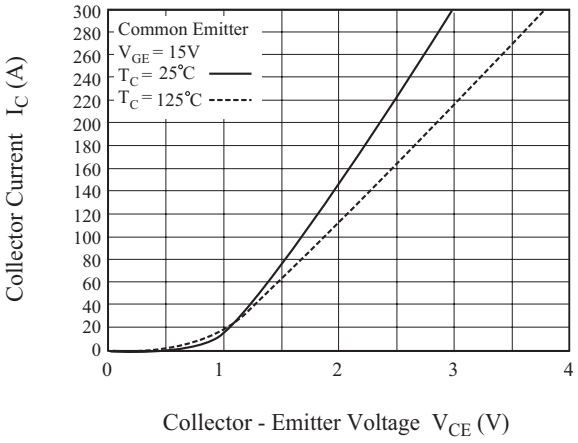


Fig 3. Saturation Voltage vs. Case Temperature

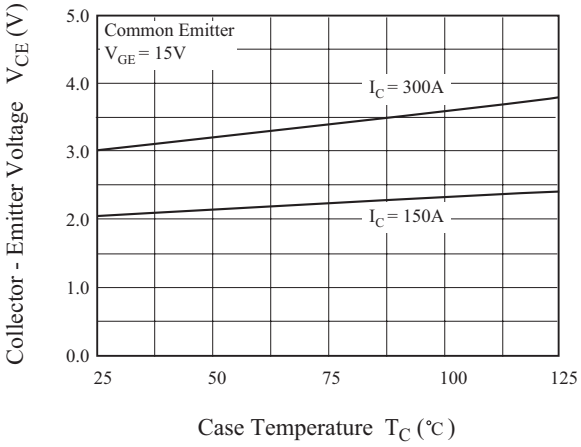


Fig 4. Saturation Voltage vs. V_{GE}

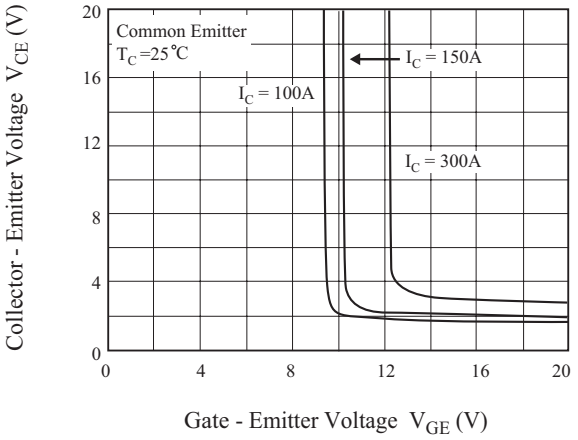


Fig 5. Saturation Voltage vs. V_{GE}

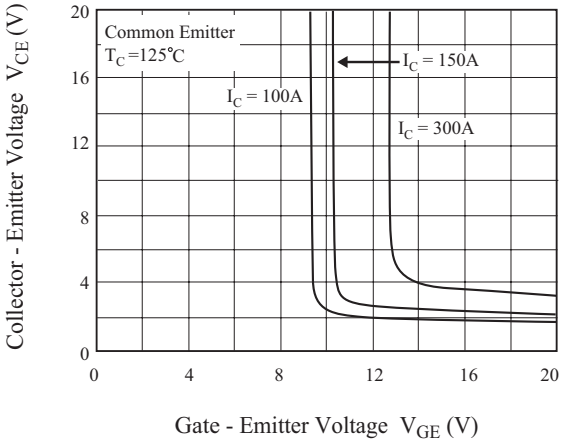


Fig 6. Capacitance Characteristics

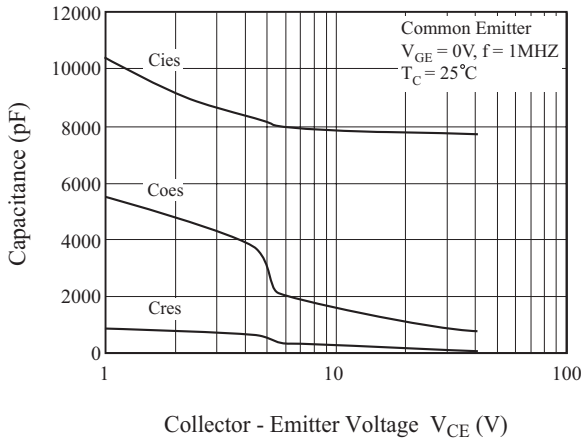


Fig 7. Turn-On Characteristics vs. Gate Resistance

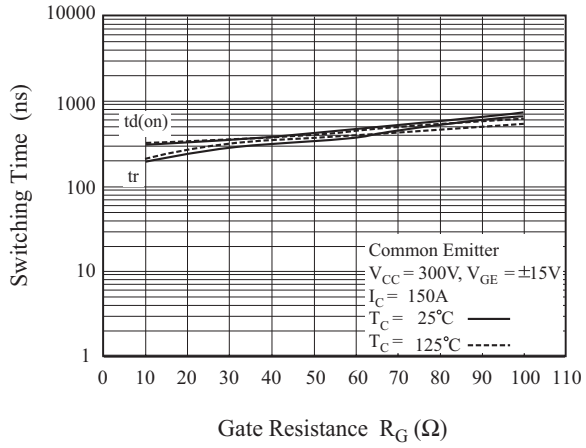


Fig 8. Turn-Off Characteristics vs. Gate Resistance

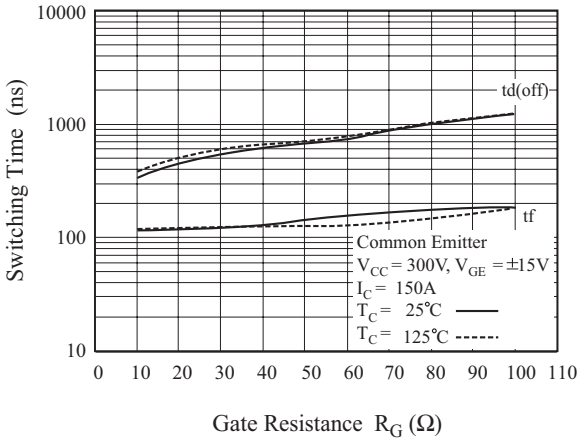


Fig 9. Switching Loss vs. Gate Resistance

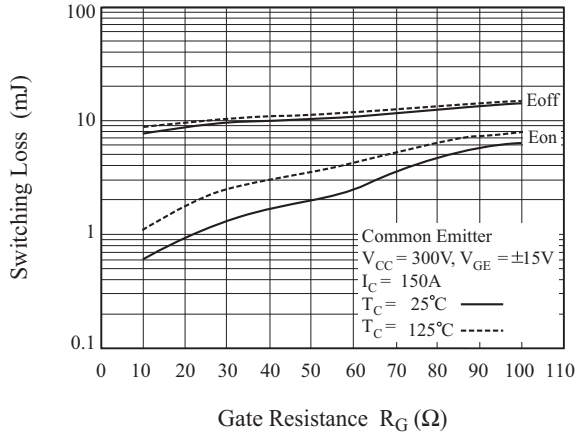


Fig 10. Turn-On Characteristics vs. Collector Current

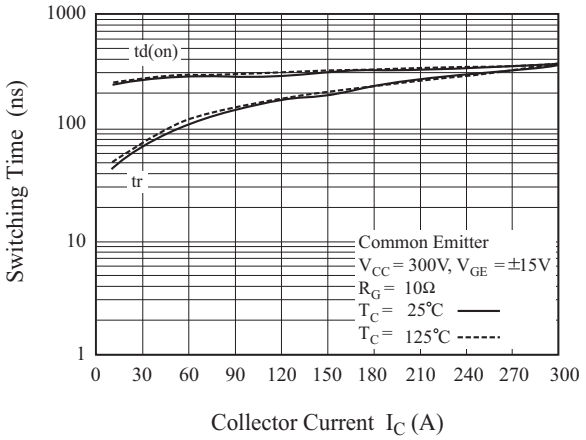


Fig 11. Turn-Off Characteristics vs. Collector Current

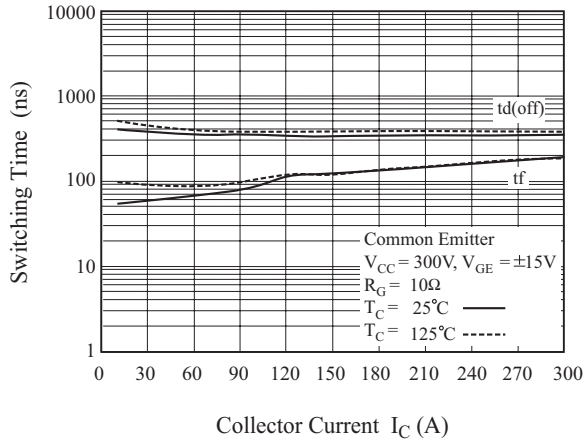


Fig 12. Turn-Off Characteristics vs. Collector Current

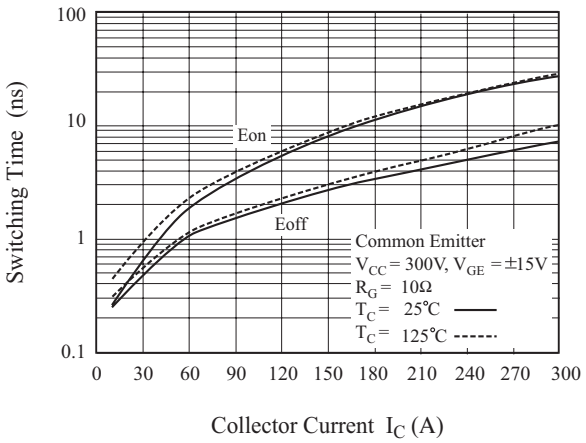


Fig 13. Gate Charge Characteristics

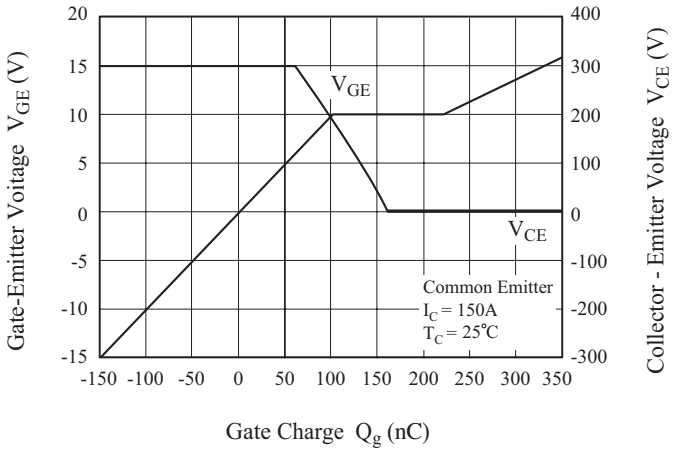


Fig 14. Reverse Bias Safe Operating Area (Max)

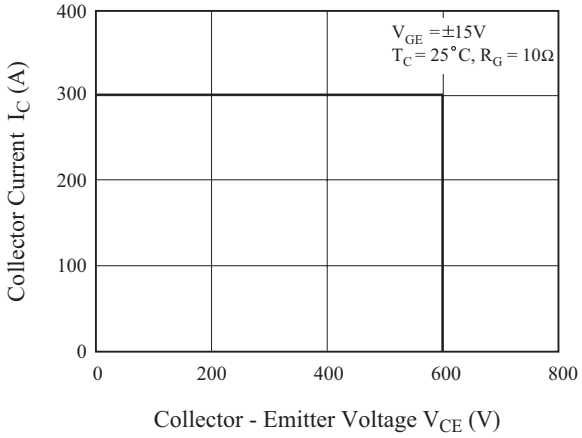


Fig15. Transient Thermal Response Curve

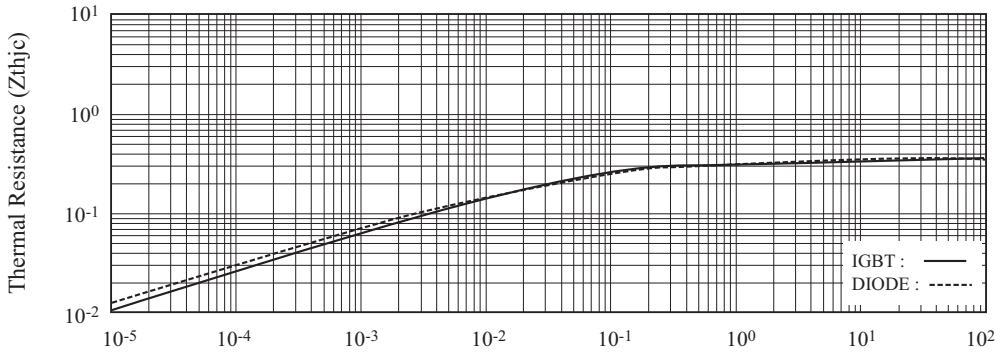


Fig 16. Forward Characteristics

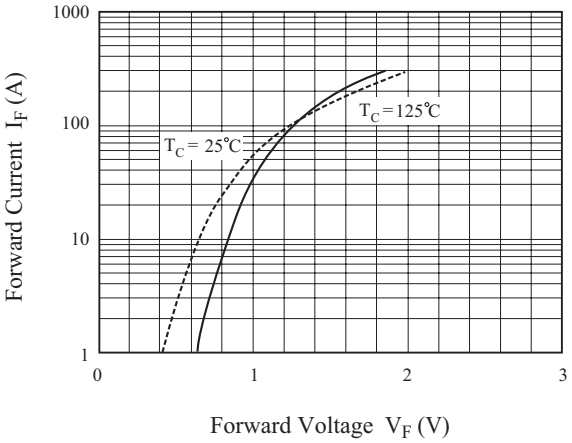


Fig 17. Reverse Recovery Current

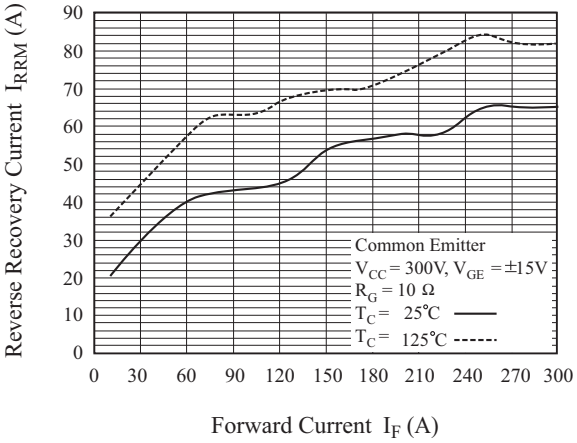


Fig 18. Reverse Recovery Current

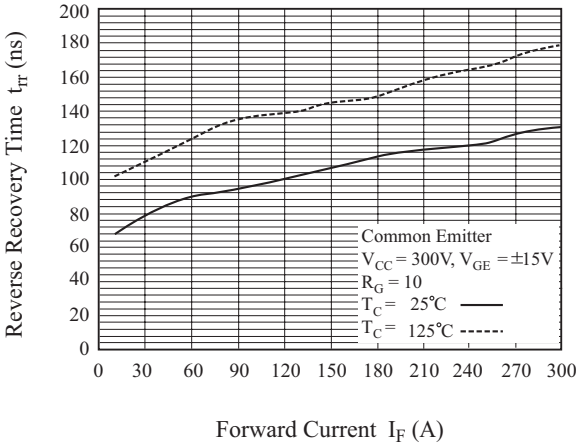


Fig 19. Switching Test Circuit

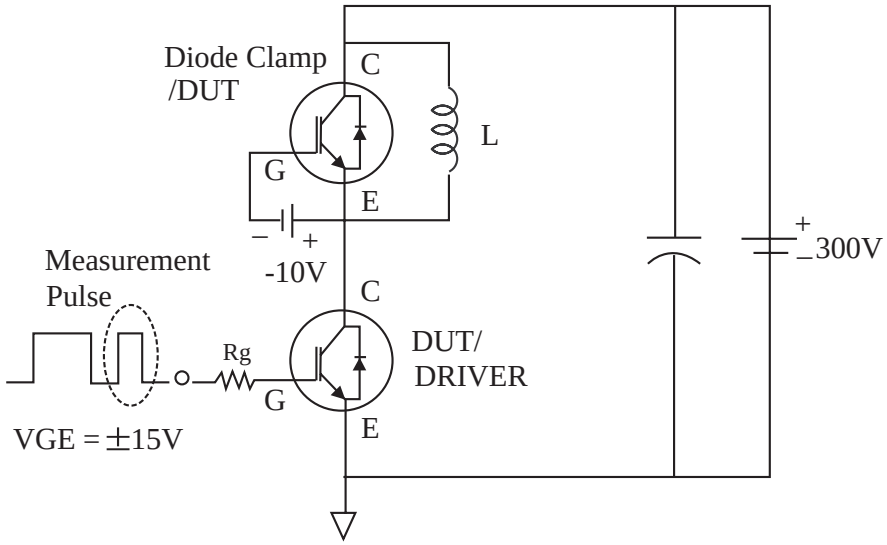
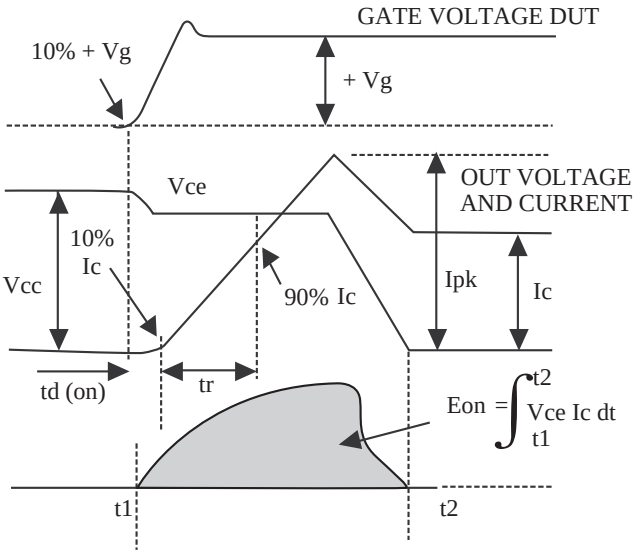


Fig 20. Definition Switching Time & Loss



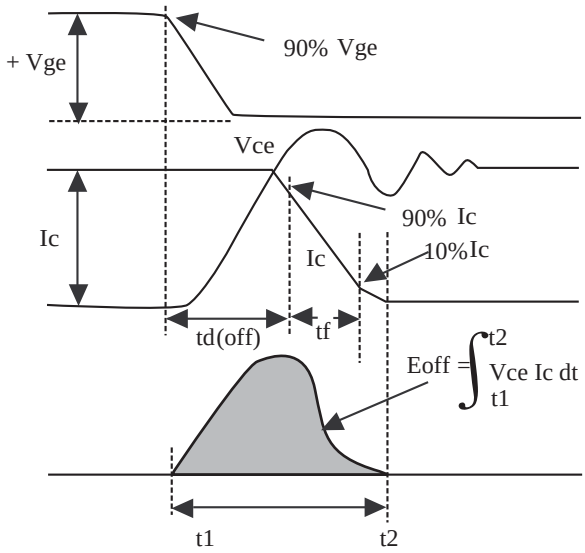


Fig 21. Definition Diode Switching Time